

BMW Plant Berlin.

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BMW Motorcycles from Berlin – a Unique Story of Success. Model Initiative Leads to Growing Sales and Turnover.

With the total number of vehicles delivered to customers amounting to 97,474 units, BMW Motorrad recorded an increase in motorcycle sales in 2005 by 5.6 per cent and reached a new record in the process. Turnover was up over the previous year by 18.9 per cent to Euro 1.223 billion, also achieving the highest figure ever seen in the history of the Company. Profits in the BMW Motorcycles Segment likewise improved significantly in fiscal 2005, the result of ordinary business increasing by 93.5 per cent to Euro 60 million (previous year: Euro 31 million).

The Company was particularly successful last year in Spain (total sales of 8,003 units, up by 48.1 per cent over the previous year), followed by Great Britain/Ireland (5,651 units; 21.7 per cent), and Italy, with an increase in sales by 11.4 per cent. Indeed, with a overall number of 12,700 units delivered to customers, Italy has virtually caught up with the USA (12,803 units), making both countries together the second-biggest BMW motorcycle sales markets following Germany (24,064 units).

With BMW Motorrad being the biggest manufacturer of motorcycles in Europe, Europe is also the Company's most significant sales market, accounting for 71,920 units delivered to customers in 2005. And while the overall market in the plus-500 cc category was up in Western Europe by 1.1 per cent over 2004, BMW Motorrad succeeded in boosting sales by no less than 6.3 per cent, therefore enjoying a by far over-proportional share in this positive development. In the segment of large-displacement motorcycles above 500 cc, BMW has a market share in Europe averaging 13 per cent overall.

The President of BMW Motorrad, Dr. Herbert Diess, regards the strength of the Company in Europe as a natural development: "National borders are dissolving and tumbling down to an increasing extent. Hence, no longer Germany alone, but rather the whole of Western Europe has become the home market for BMW Motorrad." Herbert Diess sees particularly the development of markets in Italy, Spain and Great Britain as a significant indicator confirming the successful re-orientation of the Company: "In these countries we are winning over above all young purchasers in more sporting and dynamic segments. And that proves that we are going the right way with the more sporting configuration of our motorcycles and with the new design line we originally started with the R 1200 GS."

The best seller by far was the R 1200 GS long-distance enduro launched in spring 2004 and winning over no less than 25,705 customers worldwide in 2005 – equal to an increase in sales by 35.5 per cent over the previous year's record figure. This makes the R 1200 GS one of the best-selling motorcycles in the world in the plus-500 cc segment and the so far most successful BMW motorcycle ever built.

The next model in the top-selling hitlist in 2005 is the newly launched R 1200 RT long-distance enduro accounting for 14,538 deliveries to customers. And even in its fifth year, BMW Motorrad's single-cylinder model series remains tremendously popular, with sales of the F 650 GS, including the Dakar version, amounting to 11,949 units.

Entering production in early 2005 in the guise of the K 1200 S, the new K-Series has also outperformed all expectations in its first full year of production. Together with the K 1200 R entering the market in the second half of the year, 13,665 units of this four-cylinder developed completely new from the ground up were delivered to customers worldwide in 2005. As a result, the new K-model generation has outperformed its comparable predecessors from the start by more than 50 per cent.

The highlight in 2006 is the launch of BMW Motorrad's brand-new series of two-cylinders featuring the F 800 S Sports and the F 800 ST Sports Tourer. Introducing this fourth model series in addition to the single-cylinder, Boxer and four-cylinder models already in the market, the Company is preparing its successful entry into the high-volume but fiercely contested market of so-called midrange motorcycles.

It is precisely in this segment that BMW Motorrad sees a big gap and customer requirements no motorcycle in the market has been able to fulfil so far. Again in the words of Dr. Herbert Diess: "The motorcycles available in the midrange segment are currently still very specific – either they are highly tuned supersports more suited for the race-track, or they are more simplistic entry-level models. Introducing the F 800 S and ST, on the other hand, we now offer high-grade, sophisticated all-round motorcycles with precisely the features many customers have been looking for for a long time.

Even the beginner and re-entrant are able to immediately handle the lower weight of these machines quite incomparable in terms of their excellent handling and agility. Together with their well-balanced engine characteristics focusing above all on extra torque, BMW Motorrad's new models therefore offer supreme riding pleasure, even for the experienced rider who has already seen a lot."

Both of these new models, the F 800 S Sports and the F 800 ST Sports Tourer, are perfectly equipped and offer most advanced engine and running gear technology. The usual range of versatile, high-quality BMW Accessories then allows the customer to personalise the motorcycle to all of his or her individual demands. Maximum output of 85 hp (62.5 kW), in turn, together with low unladen weight of approximately 204 kg (450 lb) and, respectively, 209 kg (461 lb) (dry weight: 182/187 kg or 401/412 lb), ensures thrilling performance of the highest standard to meet the demands of even the most discerning rider.

Preparations at BMW's Motorcycle Plant in Berlin for ramping-up production of the new model series have been progressing at full swing in the past few weeks and were concluded according to plan on 1 March. Official production of the new generation of two-cylinders then started on 2 March in the presence of the Berlin Under-Secretary of State for Economic Affairs, Volkmar Strauch, and the Minister for Economic Affairs of the State of Brandenburg, Ulrich Junghanns, who were attending the Berlin Motorcycle Plant at the time for a meeting of the Berlin-Brandenburg Automotive Industry Network. While the first customer motorcycle, an F 800 ST Sports Tourer, was coming off the line, the politicians highlighted the significance of BMW's Berlin Plant and of the automotive industry as a whole for the entire economic region.

In the words of Under-Secretary of State, Volkmar Strauch: "Both the automotive and the suppliers industry clearly prove that production is quite possible here in the region of our capital city at the highest level of technology, companies working successfully for the world market. The Berlin-Brandenburg Automotive Industry Network seeks to intensify relationships between the various companies, scientific research institutes, and state authorities, thus strengthening the local economy as a whole."

"The automotive industry, which naturally also includes motorcycle production, has become a strong growth industry in the Berlin-Brandenburg region encompassing the capital city of our country. This is where renowned large companies and innovative medium-sized firms supplement one another. I am very happy to note that the industry is networking increasingly in and around our capital city, thus further strengthening the competitiveness and innovative power of the industry in our region as a whole. And BMW plays an absolutely indispensable role in this context", stated Ulrich Junghanns, the Minister of Economic Affairs of the State of Brandenburg.

Employing a workforce of approximately 2,200 associates, the BMW Berlin Plant is one of the most significant industrial employers in the capital city of Germany. In the last three years alone, the overall investment made by the BMW Group in Berlin at the location of the Plant amounts to some Euro 100 million. Making this kind of investment, the BMW Group is obviously underlining its ongoing commitment to Berlin as a centre of industry and production.

In all, 92,012 motorcycles came off the production lines at BMW's Berlin Plant in 2005. To secure and protect production processes in the light of new models being ramped up, production had been slightly decreased versus the previous year, down by 1.9 per cent from an overall figure of 93,836 units.

Looking at the current year of business, we see that BMW Motorrad's model initiative has already started to generate a positive effect on motorcycle production at BMW's Berlin Plant: Introducing the R 1200 GS Adventure long-distance enduro, the K 1200 GT long-distance sports tourer, and the R 1200 S sports boxer, the Company has successfully started series production of no less than three new models in the first few months of this year alone. Now the start of production of the new F 800 models marks a further milestone in the history of the Plant where all BMW motorcycles have been built ever since 1969.

The BMW Plant in Berlin-Spandau.

History of BMW Plant Berlin.

BMW's Berlin Plant has one of the longest histories and richest traditions of all BMW Group production facilities. And in the capital of Berlin, the Plant builds not only BMW's legendary motorcycles, but also components for all BMW cars shipped to other BMW plants within the BMW production network.

The history of Bayerische Motoren Werke started with the production of aircraft engines in Munich back in 1916. The first BMW car, on the other hand, was built in Berlin: On 22 March 1929 the first BMW 3/15 PS – often referred to by its popular name as the “Dixi” – came out of the production hall leased at the time by BMW near the old Berlin-Johannisthal Aerodrome.

The first BMW motorcycle, the R 32 with its air-cooled two-cylinder boxer engine and driveshaft, had already been presented at the German Automobile Show in Berlin in 1923. And to this day, for more than 80 years, this ingenious design principle has remained the typical feature of most BMW motorcycles extending up all the way to the latest generation of Boxers.

BMW's Berlin Plant was part of the action almost from the very beginning: Like at BMW's original plant in Munich, the history of BMW AG started here also with the construction of aircraft engines. Indeed, BMW associates have been working in the red brick halls near Julius Tower ever since the Company merged with Brandenburgische Motorenwerke (Bramo) in 1939 – inter alia, this is where the aircraft engines of the legendary Ju 52 were built.

BMW's first motorcycle from Berlin – a BMW R 60/2 – came off the assembly line in 1967. But BMW motorcycle history at the Berlin Plant started in the former Aircraft Engine Plant a number of years earlier in 1949, with production of the first components for BMW motorcycles at the time still built in Munich. Then, over the years, motorcycle production was transferred step-by-step from Munich to Berlin, with frame construction, for example, starting in 1958, complete motorcycle assembly in 1967.

The last step in this production shift was in 1969 when, starting engine assembly and production of the successful BMW R 75/5, the Berlin Plant once and for all became the BMW Group's one and only production facility for BMW motorcycles.

Together with ongoing progress in motorcycle technology, motorcycle production at the Berlin Plant has consistently developed in recent decades: To build the original number of 40 motorcycles a day, the Company required only 30 associates in 1967, assembling individual motorcycle parts and components at 12 production stations along the line – and naturally doing everything by hand in the process.

Back then nearly all parts and components were made directly at the Plant, with almost 400 associates employed at the time in motorcycle production.

Over and above the ongoing process of modernisation, motorcycle production was significantly expanded in 1983, with BMW AG investing some DM 500 million in an entirely new assembly building and assembly system, as well as a highly automated production line for engine components.

Ten years later the Plant was modernised and expanded once again for the introduction of the new generation of Boxers, with both assembly and the machining operations for engine and suspension components being raised to the most advanced standard. Indeed, another assembly line has been set up for assembly of the single-cylinder F 650 models built at the Berlin Plant since spring 2000.

Today a total workforce of 1,923 associates builds up to 540 motorcycles a day in four model series with single-, two- or four-cylinder power units – truly an outstanding story of success which reached yet another highlight on 6 February 2001, when the millionth BMW motorcycle built in Berlin, an elaborately painted R 1150 RT, came off the assembly line and was auctioned in the internet to the benefit of UNICEF.

To achieve the desired fast rate of growth in the fiercely contested motorcycle market, the BMW Group invested more than Euro 117 million in the years 2001–2003 alone in the expansion of motorcycle production. In February 2002 the Berlin Plant then opened up a brand-new production building for motorcycle assembly which, featuring its intelligent C-hook system, is absolutely unique in the worldwide motorcycle industry. The most advanced and sophisticated five-directional processing centres, a high-tech 10-directional laser cutting facility, and an exclusively developed valve seat pressing machine in the machining shop are further examples of the superior efficiency and flexibility offered by the Plant – and at the same time guarantees for premium quality.

This kind of quality is also ensured by the new engine assembly line with its highly flexible assembly system and technologically demanding test systems starting operation successfully in September 2003.

Since November 2003 the Berlin Plant has been painting all motorcycle parts and components in a new paintshop boasting trendsetting technologies and meeting the strictest environmental standards.

Given these features, BMW's Motorcycle Plant in Berlin is acknowledged as one of the most modern and advanced motorcycle production facilities in the world. And apart from the production of motorcycles, the Berlin Plant, forming part of the BMW Group's production network, has also been building components for car production at other plants since 1979, brake discs, for example, going to BMW's car production plants in Munich, Dingolfing, Regensburg, Leipzig, Steyr (Austria), Rosslyn (South Africa), and Spartanburg (USA).

History of the BMW Berlin Plant – an Overview.

1939	BMW AG takes over the Plant and production of aircraft engines from Brandenburgische Motorenwerke (Bramo)
1945	Temporary production of garden and kitchen appliances
1949	Production of machine tools and motorcycle components at BMW Maschinenfabrik Spandau
1967	Start of motorcycle assembly in Berlin. The first BMW motorcycle built in Berlin, a BMW R 60/2, comes off the assembly line
1969	Starting the assembly of engines, the transfer of BMW motorcycle production to the Berlin Plant is concluded
1975	The 100,000th BMW motorcycle built in Berlin comes off the production line
1979	Production of car brake discs is moved to Berlin
1984	Introduction of the K-Series marks the inauguration of the new Assembly Hall and Machining Shop accounting for an investment of DM 500 million
1993	Expansion of assembly facilities and machining operations for production of the new generation of Boxer motorcycles
1996	The last “old” Boxer, an R 80 GS Basic, comes off the production line
2000	Production of the F 650 GS starts on the new assembly line
2001	Production of the millionth BMW motorcycle from Berlin
2003	Expansion of motorcycle assembly through the completion of a new production building
2006	Start of production of the fourth series of motorcycle models marked by the launch of the F 800 S and F 800 ST

Sustained Action: Workforce, Environment, Society.

In this day and age, it is no longer possible to measure the success of a company in terms of purely economic aspects alone. Rather, it is essential for every commercial enterprise to find an appropriate balance of economical, ecological and social targets.

These pillars of sustainability supplement one another at the BMW Berlin Plant, forming the foundation for lasting success. The Plant therefore acts as a neighbour readily assuming responsibility, as an attractive employer, and as a socially committed partner, thus ensuring its long-term economic success.

The BMW Berlin Plant currently has a workforce of 2,216 associates. Like all associates of the BMW Group, they benefit from the Company's future-oriented human resources policy.

Out of this total headcount, 1,923 associates are employed in motorcycle production, 293 work in the production of automobile components. And while the share of foreign associates at the Berlin Plant is 10.6 per cent, the share of female associates is just 8.2 per cent, reflecting the traditionally low share of females employed in metalworking professions. The share of skilled workers in motorcycle production at the Plant, finally, is more than 97 per cent.

Particular attention is given at the Berlin Plant to working time concepts. Even back in the early '90s, the Plant already applied demand-oriented working time concepts in order to respond appropriately to seasonal fluctuations in the demand for motorcycles. Today no less than 11 different working time concepts are in place at the Plant, each with different shift lengths: Production of automobile components is in three and four shifts, while the various departments in motorcycle production operate in a one- to five-shift system or in continuous operation with 21 shifts a week. In many areas the associates are furthermore integrated in individually conceived flexitime systems.

Since early 1998 there has also been a market-oriented working time concept in motorcycle production, with variable shift and weekly working hours including Saturdays and full-year working time compensation increasing the level of flexibility in production and creating new jobs in the process.

The extension of weekly production hours in the first seven months of the year with substantial demand for new motorcycles ensures a smooth course of production tailored to market requirements. Flexible compensation of working hours in the remaining five months up to the end of the year, in turn, ensures consistent, steady employment of associates, with production quality remaining at a consistently high level.

From January to July the roughly 550 associates in motorcycle assembly work in two shifts from Monday to Friday, with a total of 8 ½ hours per shift. One additional shift may then be added on Saturday, depending on demand in the market. Then, starting in August and continuing until the end of the year, the shifts become half an hour shorter and the Saturday shift is dropped altogether, with associates working in only one shift during the months of October and November, when demand drops to the lowest level.

Together with additional free shifts, this gives associates an average working week throughout the year of 35 hours as agreed in the collective wage and salary agreement.

A further important cornerstone of the Plant's human resources policy is specific, target-oriented initial and further training of associates. Currently the Berlin Plant employs 71 young associates in 8 different professions, training them as Industrial Mechanics (specialising on production technology), Electronics Specialists for Operating Technology, Automotive Mechatronics (specialising on motorcycle technology), Mechatronics, Process Mechanics, Warehousing Specialists, Social Insurance Managers, and Industrial Business Managers.

The wide range of further training offered in Berlin extends from computer and language training through personality training all the way to safety training for the motorcycle enthusiast. Various projects focus furthermore on new learning concepts and are conducted in cooperation with various schools in Berlin.

As a Company committed to sustainability, the Berlin Plant assumes responsibility for the careful and conservative use of resources as well as the minimisation of emissions affecting the local and global environment. New, environmentally friendly materials, production processes helping to save energy and water, as well as efficient recycling of materials and production waste help to make BMW motorcycles more compatible with the environment. Preventive and back-up processes such as training of associates, the establishment of environmental protection targets in product development, as well as cooperation with audited transport and waste disposal companies also serve to protect the environment through their positive impact.

The new Paintshop at the Berlin Plant accounting for an investment of Euro 54.2 million and supplying motorcycle assembly with ready-painted fuel tanks and fairing components since November 2003 makes a particularly efficient contribution to environmental protection and the preservation of resources. Indeed, the new Paintshop has a direct impact on various environmental aspects, with almost exclusive use of water-based paint serving to improve the processing of materials.

Water used to separate and precipitate paint sludge is recycled in order to minimise the total amount of water required as well as the amount of waste water. Thermal after-burning, in turn, serves to significantly reduce emissions.

Many other features and improvements also help to minimise the effects of the Paintshop on the environment, taking all kinds of requirements into account. One example is that the pipes are no longer rinsed with a pure, 100 per cent solvent, but rather with a mixture of fully desalinated water and a hydrolysis fluid at a ratio of 8 : 1.

Yet a further point is that the use of water-based paint helps to significantly reduce solvent emissions. Various heat recirculation facilities such as heat exchangers or a thermal wheel, finally, also serve to enhance the overall level of operating efficiency and save energy in the process.

The Berlin Plant also combines economic and environmental benefits in the areas of raw materials management and waste disposal. All metal waste and more than 90 per cent of all other waste from production and administration goes into recycling, waste being collected, checked and transferred to disposal companies at four different waste management centres as a function of its hazardousness.

Various measures also serve to reduce from the start the amount of material used in production and subsequently entering the disposal process. Recycling of emulsions, for example, where the lubricant to be replaced is delivered to one of three emulsion centres and subsequently re-used as a cooling lubricant, serves to minimise the total volume of cooling lubricant required. Yet a further contribution to the preservation of resources is made by returnable packaging used since 2001 initially for a number of European markets to protect motorcycles being delivered to the customer. And since 2005 the Plant has also been using a newly developed packaging concept combining wood and corrugated cardboard. This special packaging reduces the amount of wood required by 900 tonnes a year – approximately 15 kilos per motorcycle – and thus helps significantly to protect the environment.

Preservation of the environment through sustained management is ensured not only by future-oriented technologies, but also by associates acting in accordance with environmental requirements, that is with the right kind of mentality. Training of associates and greater efficiency in production, for example, have served in recent years to consistently reduce the consumption of water at the Berlin Plant, despite the increasing number of models built. In many cases environmental protection and occupational safety go hand-in-hand in this process. Regular supervision of job structures, job processes, technical facilities and the right kind of safety mentality on the part of associates at work guarantee clear recognition of hazards in good time and provide an appropriate margin for preventive action. And last but not least, qualified training ensures safe and reliable use of even the most advanced and sophisticated technologies.

The BMW Group's Berlin Plant also benefits from an integrated operating and environmental management system. To ensure production compatible with the environment, for example, BMW Motorrad – as the only motorcycle manufacturer in the world – is certified and validated to the DIN En ISO 14001 International Environmental Management System and to the EMAS Eco-Management and Audit Scheme as well as the OHSAS 18001 Occupational Health and Safety Standard. Hence, the Berlin Plant ranks right at the top internationally also in terms of environmental care and protection.

The BMW Group in Berlin.

With its workforce of approximately 2,200 associates, the BMW Plant in Berlin is one of the most significant employers in the capital city of Germany. But the Plant is not the only BMW Group operation in Germany's largest city. Rather, the BMW Group employs a total of about 3,000 associates in Berlin working at BMW Retail Outlets and at MINI Berlin, at the BMW House on Kurfürstendamm, and at the BMW Group Representation Office in the capital of Germany, the Berlin Office, and, finally, at BMW Maschinenfabrik Spandau GmbH.

The commitment of the BMW Plant to social affairs and interests also goes back a long way. For years the Plant has been acting as a partner of the local Landesverkehrswacht (State Traffic Safety Association) in compiling personalised school route plans for children attending primary school in Berlin. These plans take children in the capital city safely to school and back home again even in dense city traffic – and their significance is borne out by the fact that almost 50,000 school route plans of this kind have been made out in the interest of traffic safety since 1995.

A further important point is that the Berlin Plant presents new professional perspectives and offers interesting insights into the world of professional technology to girls each year at the annual BMW Plant Girls Day.

Again as a clear sign of social responsibility, the Company is deeply involved in schoolchildren and youth activities such as the "Jugend forscht" ("Young Researchers") regional contest in Berlin North, just as the Plant has been involved for some 25 years in the Annedore Leber Vocational Training Scheme for Disabled Children and Youths. And again last but not least, the Plant has been donating money to neighbourhood projects for many years.

Closely cooperating with the universities in Berlin, the BMW Group has been organising the "Berliner Hauptstadtgespräche" ("Berlin Capital Talks") since 1998, offering public panel discussions among representatives of industry, politics and science on issues of the future in the Berlin Republic.

BMW Motorcycle Production in Berlin. **Unique Network of Production,** **Logistics, and Sales.**

All the way from Berlin to dedicated enthusiasts the world over: Motorcycle riders in more than 130 countries around the world trust in the quality of BMW motorcycles. Around the world, every BMW rider is able to configure his or her personalised motorcycle at one of approximately 1,000 BMW Motorcycle Dealers or Importers.

The Berlin Plant builds all BMW motorcycles in various model series for the international market. A worldwide sales and distribution system, the flexible production structure at the Plant, and sophisticated logistics then ensure that each customer can experience his or her “dream on two wheels” not only in the brochure or in the internet, but also live on the road.

Whether in Finland, South Africa, or Japan – tailored to national specifications and regulations, every BMW customer is able to choose his or her personalised BMW from a wide range of models, colours and special features. The Berlin Production Plant builds no less than four model series with 14 models overall in up to six different colour schemes and with a wide range of options and special equipment. Together with national versions and specifications involving the motorcycle’s illumination, injection and exhaust systems, tyres, controls, stickers and specification labels, as well as the on-board literature, customers have the choice of several thousand variants. So it is no surprise that hardly any two motorcycles from the Berlin Plant are absolutely identical, meaning that each customer is able to enjoy his or her perfect, tailor-made machine.

Customer orientation has top priority for BMW Motorrad. And it is precisely for this reason that the Customer-Oriented Sales and Production Process (KOVPP) has been introduced step-by-step since 2001, masterminding the entire production process from the customer’s order all the way to final delivery of the motorcycle. An online ordering system networks all BMW Motorcycle Dealers the world over directly with the Berlin Plant, the Company’s Sales Partners therefore being able to find out within seconds whether a motorcycle of the type requested and with the specifications needed can be built for the time of delivery desired. And even then the customer enjoys optimum change management until shortly before the start of production, enabling him to modify, say, the colour and special equipment of the motorcycle until shortly before production starts. So all this is possible before customer orders are transferred from the Central Management System in Munich to the assembly lines in Berlin for the actual start of production.

Sophisticated logistics serve to mastermind motorcycle production for optimum efficiency and cost management. Interacting closely with Sales, Purchasing, and Production, the Logistics Division plans the range of models in each production cycle, determines the optimum sequence in production, and ensures punctual delivery of the motorcycle in accordance with the customer's request.

The Logistics Division also plans and coordinates the supply of materials to Production and Assembly, ensuring that all parts and components arrive in the right amount, at the right time, and at the right place in optimum quality and with efficient cost management.

This is indeed a complex process, considering that the Berlin Plant receives some 9,000 different parts or components from more than 400 external suppliers, all of which must arrive exactly on time and in the right amounts. Specialising largely on the production of motorcycles, some 65 per cent of these suppliers are based in Germany, 34 per cent in other European countries and 1 per cent, respectively, in the USA and Japan.

Assembly of Boxer and Four-Cylinder Models.

As a leader in technology in the worldwide automotive industry, the BMW Group systematically develops technologies for cars and motorcycles of the future. And while the development of BMW motorcycles benefits directly from the Company's research and development facilities in Munich, the Berlin Plant has become one of the most advanced motorcycle production facilities in the world. Indeed, BMW's Berlin Plant uses state-of-the-art technologies throughout the entire production process, from production of the suspension and running gear all the way to engine production, the Paintshop, and motorcycle assembly as such.

Production of BMW's Boxer and four-cylinder models starts in the Machining Shop building engine components for BMW motorcycles. Controlled by highly qualified specialists, more than 40 CNC machining centres manufacture and process the engine housing, cylinder heads, crankshafts, connecting rods, and all running gear and suspension components for all BMW motorcycles with a two-cylinder Boxer or a four-cylinder inline engine.

The engine components still in crude, unfinished condition come from other BMW Group Production Plants as well as external suppliers. Modern processing and finishing machines then ensure an absolutely precise and extremely flexible finishing, milling and polishing process of the highest standard. The crankshafts, for example (and there are no less than four different types of crankshafts for BMW motorcycles), are all machined and processed in a high-grade, fully computerised network of grinding machines.

In the Machining Shop all components go through several automated and coordinated processing stages. Highly efficient, universal processes in the machining operations ensure a high standard of quality on the engine and suspension components, the cylinder head, for example, being machined in CNC-controlled five-directional processing centres and by a valve seat insertion machine.

The crankcases for the high-performance power units in the new K-Series, to take another example, are for the first time cut by means of tools with titanium body structures. And at the same time various new and extremely flexible machines are also used in production, such as the honing centre now serving to give the four-cylinders in the new K-Series and the four-cylinder featured in the K 1200 LT their final, high-precision finish on the cylinder liners.

The coolant required in the machining process is made up largely of water combined to form an emulsion together with a special, highly concentrated cooling lubricant. Specialised processes and refinement of this fluid give the cooling lubricant used a service life of well over five years.

The BMW K 1200 S and K 1200 R both feature entirely new front-wheel suspension: Separated from the spring and damper functions, the revolutionary Duolever feeds forces perfectly into the frame structure and, through the low connection points, provides an absolutely new and innovative frame concept – a large-volume aluminium frame now made up of nine different individual sections.

A new concept for machining the frames operates within a separate production island, with two machining centres linked to one another. Here cast aluminium parts and forgings, as well as the frames already welded, move on to the next free machining centre on freely moving workpiece carriers controlled by transponders. These machining centres then cut and process the components in an ultra-fast, dry process, without using any kind of coolant as in the past.

Prior to welding, the ends of the individual frame tubes are prepared for frame welding in a modern ten-directional laser cutting system. And with all components being designed for small tolerances, the parts and processes are consistently checked and supervised by means of high-precision testing and measurement units.

This precision in the preliminary phase is indeed an important prerequisite for excellent welding by the robots. In the Suspension Technology Competence Centre no less than six robot “families” weld the various suspension and frame components for BMW motorcycles. The Bodyshop is indeed particularly skilled in welding components made of aluminium, two special tandem robots making the aluminium frames for the four-cylinder model series.

The complex rear frame components for the R 1200 GS are also welded by robots, with some sub-assemblies coming from manual welding booths. The complete rear section of the frame, for example, consists of up to 80 individual components.

In engine assembly highly specialised associates put together the individual engine components to form one complete whole: In the ultra-modern, ergonomically designed engine assembly centre with almost 90 workpiece carriers, 145 associates manufacture all types of engines. Job management and processing in the assembly of engines is conducted automatically by an assembly computer.

A horizontal conveyer line allowing various intersections and delivery routes transports engines on workpiece carriers to the individual assembly stations. Incorporating integrated data carriers (transponder technology), these workpiece carrier units provide important assembly information for the respective engine – and at the same time the current assembly status may be checked in detail by an integrated, work-based information system.

Technologically demanding testing systems such as the world's only combined cold-running and gearbox tester serving to check engine torque, engine speed, noise emissions, and various pressure tests on the running engine, as well as a test facility determining any leaks from the engine, serve finally to secure the production process and optimise the quality of parts supplied.

The 16 valves on the double-camshaft power unit featured in the new K-Series are operated by light and extra-stiff rocker arms. Given this sophisticated technology, a new, technically demanding assembly system was required for assembling and setting the valve drive. Semi-spherical units requiring the use of highly complicated handling tools are therefore used to set valve timing on this high-performance engine, with the right size and dimensions of these semi-spherical units being crucial to valve clearance: Placed into the rocker arms on one side, these new test units check whether valve clearance is correct and on target. Should this not be the case, the system automatically calculates the right dimensions and re-starts the process of measuring valve clearance after replacement of the semi-spherical assembly units.

Five robots increase the degree of automation in engine assembly, for example in the application of sealant.

Working in two shifts, the production specialists need about 90 minutes to assemble a Boxer engine, with assembly of a four-cylinder inline power unit taking about 120 minutes.

To perfectly mastermind the production of up to 100 versions of the rear axle on a BMW motorcycle, the rear axles are assembled by an assembly unit specially designed and constructed for this purpose. All the processes involved are therefore coordinated with utmost precision one after the other and with exactly the right logistics.

Technically speaking, this new system leaves absolutely nothing to be desired: Gear flank clearance is now measured on 3,600 points for each rotation of the gear, providing extremely precise data on the overall gear pattern, and with an improved adjustment mechanism keeping the entire configuration very strong and robust.

Yet another new feature is automatic leakage control and the automatic process of filling exactly the right amount of final drive fluid with absolute precision down to the last millilitre.

Fully integrated in the process of engine production, the Paintshop combines innovative technologies and traditional craftsmanship for supreme perfection all round: On the one hand five computerised robots apply the paint on to several thousand motorcycle components a day in up to 70 different configurations and designs, consistently maintaining a supreme standard of quality and operating at high speed. The superior flexibility of this efficient system helping to preserve resources allows rapid exchange of parts and components, as well as more than 30 different colours. On the other hand BMW's decal line painting specialists paint the traditional lines on the motorcycle tanks by hand, displaying supreme craftsmanship and skill in the process. And in one of the most advanced painting facilities worldwide, BMW Motorrad applies hydro-technology for supreme environmental care and compatibility.

The heart of the new motorcycle assembly system is the electrical suspension railway, a flexible, inductive conveyer system with hanging carrier units referred to on account of their shape as "C-hooks". Placed on these conveyer hooks, motorcycles are guided through the entire assembly process, precisely masterminded according to the customer's order and with fully automated control.

By way of contact-free energy and data transmission, the tools and test units receive all the data and information required for highly reliable and rational production. Each C-hook is precisely followed up in the production process and the degree of completion of each model is exactly determined at all times to provide unprecedented clarity and transparency in assembly.

Moving along on these assembly hooks able to swivel by 180 degrees, the motorcycles proceed through the various assembly stations in 8 hours at the most. Apart from the contact-free transmission of energy and data not involving the slightest friction and wear, the C-hooks are perfectly aligned by the system at exactly the right working level for ergonomic purposes, allowing each associate to choose assembly conditions for each model and operating cycle. So after covering a distance of almost 4 kilometres or 2.5 miles along the suspended electric railway, the motorcycles ultimately arrive at the final packaging station after setting out from the first assembly process.

On all motorcycles the assembly and construction process starts by assembling the frame components on the engine and gearbox. The next components added are the driveshaft, rear-wheel swing arm and central spring strut, with the propeller shaft being connected and subsequently followed by the exhaust gas manifold and footrest plates. Then come the front wheel together with its fork and Telelever, the handlebar, instruments and controls, the rear section, silencer and fuel tank.

A special feature of BMW's most recent motorcycles is the electronic on-board network, all data relevant to the motorcycle being transmitted via a CAN-bus to the five control units integrated within the motorcycle. Like the stopping points on a bus line, engine management, the central suspension electronics, the instrument cluster, anti-theft warning system and, finally, the ABS control unit communicate only through one single connection.

One of the key terms in motorcycle assembly is Cascade (Control Application Sequences for Coding and Diagnostics Execution). "Cascade" stands for an extremely reliable electronic check-out process. Applying the Cascade principle, the first step is to scan in the individual features and data of the motorcycle, Cascade then checking all essential and desirable functions in a specific, programmed order – for example the direction indicators, brake light, and internal sensors. Then, via a wireless connection, the Cascade monitoring unit and the various control units exchange information and control operations, presenting the testing process as well as the result on a digital infoscreen directly on the assembly line.

A BMW motorcycle needs approximately 100 minutes on the basic assembly line before it is ready for the road. And the motorcycle already fully assembled in road trim comes off the assembly hook only once, when a team of up to 9 specialists riding motorcycles up to 100 km or 60 miles a day but quite literally not moving one metre test the machines on dynamometers at speeds of up to 120 km/h or 75 mph. In these tests they check out the ABS system, the motorcycle's brakes, clutch, gearbox, front wheel suspension, lights and suspension safety.

Following this overall check-up, the motorcycle goes back on to the assembly hook for final assembly and approval, since various fairing components, the seat or special items for police and similar motorcycles are not fitted until after these dynamic tests on one of the four finish lines in the interest of easier handling.

Finally the motorcycles leave the BMW Berlin Plant in stable crates made of a combination of wood and corrugated cardboard or in returnable steel packaging for various European markets. Delivery of motorcycles in Europe is by truck, delivery of motorcycles to overseas markets by truck and freight ships.

Assembly of BMW F 800 Models and of the F 650 GS.

Contrary to the Boxer and four-cylinder models, production of the new F 800 Series as well as the single-cylinder BMW F 650 GS is restricted to pre- and final assembly. For in this case the prefabricated components come from 35 mainly European system suppliers sending their products to the Berlin Plant. Engine assembly, in turn, is by Bombardier-Rotax in the Austrian town of Gunskirchen.

All F 800 models and the F 650 GS are built by production specialists on a special assembly line with integrated pre-assembly and dynamic testing areas, each motorcycle completing the assembly process plus subsequent testing in just three hours.

The first step is to place the engine and frame on the assembly hook, before the associates in production assemble the rear-wheel swing arm and front-wheel fork together with the wheels as well as the complete electrics and the electronic control system. Next come the handlebar complete with instruments and controls, the brake system, the rear frame with the fuel tank and, finally, the fairings, the front-wheel mudguard, as well as the seat.

The Digital Motor Electronics (BMW BMS Engine Management) control centre is programmed for the first time with BMW motorcycles directly at a special station on the assembly line.

The F 800 models feature an electronic on-board network just like their Boxer and four-cylinder counterparts. Hence, the Cascade method is also applied here in the electronic check-out testing process.

At the end of the assembly line, associates roll the motorcycle off the hook and check the ABS brake system, if and where fitted. Then all motorcycles go through the final running test on the dynamometer, before the first motorcycles – just like the Boxer and four-cylinder models – leave the Berlin Plant packed safe and sound.

Integrated Quality.

Quality assurance by BMW Motorrad does not start and end with a critical final quality inspection in motorcycle assembly. On the contrary – the principles applied by quality management are consistency and an all-round focus on quality. Self-responsibility of all associates is equally significant, continuous, ongoing improvement is a must.

This focus on quality starts from the beginning in Marketing, systematically determining the demands and expectations of customers and the product features required, which go directly into the motorcycle's development specifications. Then this spirit continues throughout the entire process of development, for example in applying preventive methods, evaluating the current status of a new model step-by-step, and systematically determining the motorcycle's reliability in practical tests.

Even before they start the delivery process, suppliers must prove their high standard of quality and their ability to deliver parts for BMW motorcycles at the right time, in the desired volume, and naturally with all quality standards properly maintained.

Applying preventive methods of quality control in processes and products, production planning also helps to maintain a high standard of quality at all points and in every respect. Both in machining processes and motorcycle assembly, all quality assurance measures are fully integrated in production activities and the responsibility for quality is held by the respective department on the basis of self-testing routines.

Product documentation in the assembly of motorcycles is ensured by the production system for quality (IPS-Q) adopted from BMW car production. All tests relevant to safety and quality are thus included in one concept and maintained throughout the entire lifecycle of the product. So whether it is manual inspections or quality data obtained from automatic facilities, all test results are recorded in the IPS-Q system. And a motorcycle may only be passed on to Sales after having successfully completed all tests and examinations required.

To back-up the processes in place, verify quality targets and further improve the quality system, quality management of BMW Motorrad conducts regular audits. System audits cover the entire Plant, process audits focus on individual processes, and vehicle/engine audits look at the product as such.

In vehicle audits at least one motorcycle is taken off the production line every day through random choice and checked completely. Particular attention is given in this case to the motorcycle's assembly data and possible deficiencies attributable to system deviations in production. This reveals even the smallest gaps in quality assurance, which can therefore be eliminated once and for all.

In engine audits, engines are taken off the assembly line at regular intervals, checked on dynamometers for their performance and consumption figures, and subsequently disassembled. Here again, the focus is particularly on the specifications applicable in each case and the detection of any systematic deviations.

BMW motorcycle production has been certified since 1997 to the DIN EN ISO 9001 Europe-wide quality standard. Excellent achievements in implementing a comprehensive philosophy of quality management were furthermore confirmed to associates at the BMW Berlin Plant through the Berlin-Brandenburg Quality Award presented to the Plant in 2002.

Further Technologies and Process Partners in Berlin. BMW Plant Berlin – Part of a Global Network.

All BMW cars come with brake discs from Berlin, where approximately 200 associates manufacture some 5.3 million brake discs a year for all models in the range. Forming part of the BMW Group's worldwide production network, the Berlin Plant delivers brake discs to the other Plants in Munich, Dingolfing, Regensburg, Leipzig, Spartanburg (USA), and Rosslyn (South Africa).

BMW's motorcycle plant in Berlin participates in the intelligent network of BMW Group production and research structures. Hence, the Development, Marketing and Sales Divisions of BMW Motorrad are based in Munich in order to capitalise on know-how and synergy effects within the BMW Group.

Drivetrain, fairing, engine and casting components are supplied to Berlin from BMW's Plants in Landshut and Dingolfing.

The BMW Group's international production network excels in particular through its flexibility, efficiency, and competence. Indeed, this is the only way to respond properly and with the right agility to market requirements and customer wishes.

Process Partners.

Laboratory tests and technologies provide the foundation for taking decisions in development and in procuring the right materials, for planning processes and determining the quality of in-house and purchased components in production. This is where new materials, combinations of materials and processes are tested and validated under laboratory conditions.

The Plant Catering Service, providing an average of 500 meals a day, also makes its very own contribution to optimum production. The modern Plant Cafeteria with its own terrace outside, serves no less than five main dishes for individual choice.

All Facts and Figures at a Glance. (Status 31.12.2005)

Berlin Plant

Workforce, overall	2,216
Share of female associates	8.2%
Share of foreign associates	10.6%
Number of apprentices	71
Working week (under the collective agreement)	35 hours
Number of working time models	12
Area, overall	179,108 square metres
Built-up area	88,295 square metres

Motorcycles

Number of associates in motorcycle production	1,923
Share of skilled workers	97%
Production at the Berlin Plant (2005)	92,012 units
Daily production in 2006	up to 540 units

BMW in the motorcycle market

Market share in Germany	18.2%
Market share in Germany (plus-750 cc segment)	28.0%
Export ratio	75.3%

Production of car components

Number of associates	293
Production of brake discs (2005)	5.3 million

Environmental protection

Share of metal recycled	100%
Share of other materials recycled	plus 90%

Contact.

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